

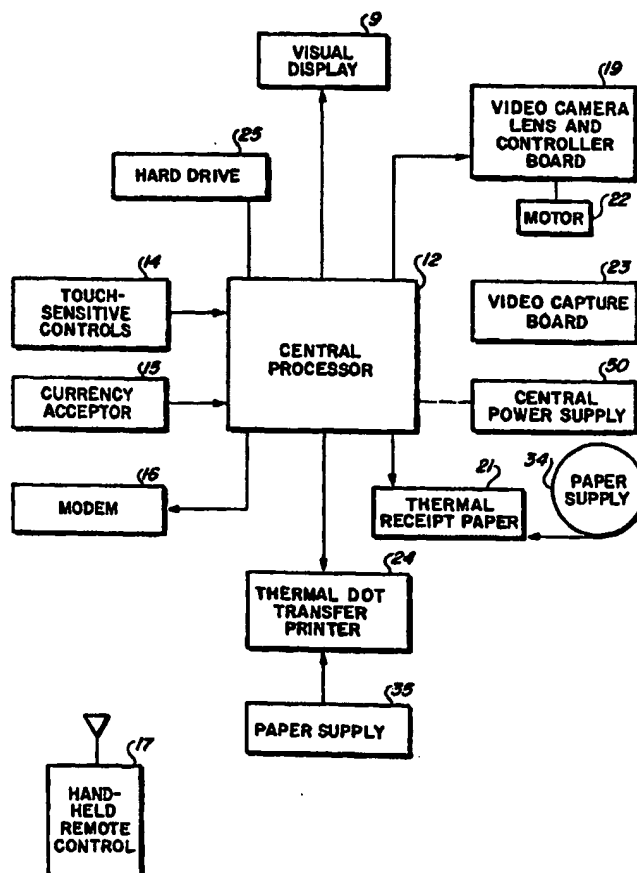


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : G03B 29/00	A1	(11) International Publication Number: WO 97/04353 (43) International Publication Date: 6 February 1997 (06.02.97)
(21) International Application Number: PCT/US95/11877 (22) International Filing Date: 18 September 1995 (18.09.95) (30) Priority Data: 08/502,483 14 July 1995 (14.07.95) US (71)(72) Applicant and Inventor: CHUMBLEY, Gregory, R. [US/US]; Suite 902, 2999 Concorde Centre Drive, Miami, FL 33180 (US). (74) Agent: DOWNEY, Robert, M.; Robert M. Downey, P.A., Suite 1480, 701 Brickell Avenue, Miami, FL 33131 (US).		(81) Designated States: BR, JP, MX, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i>

(54) Title: POSTAGE AND PHOTO VENDING APPARATUS**(57) Abstract**

An apparatus for producing and printing a photograph includes touch-sensitive controls, a visual display, a currency receiving and/or dispensing device, a hand-held remote control device for adjusting location of a photo image area on the visual display and controlling capture of a photo image of the user from a video camera lens and controller board, a first printer and a second printer, all connected to a central processor. Video impressions viewed by the camera lens are converted into a series of electrical impulses, which are selectively captured and digitized. Thereafter, a digitized photo image of the user is either combined with a stored postage meter image for printing by the second printer to produce a printed photograph on one side of an adhesive-backed postage meter strip, or, alternatively, uploaded by a high-speed modem to a host computer for processing a passport, driver's license, or other government identification-type document requiring a photograph.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	GB	United Kingdom	MW	Malawi
AT	Austria	GE	Georgia	MX	Mexico
AU	Australia	GN	Guinea	NE	Niger
BB	Barbados	GR	Greece	NL	Netherlands
BE	Belgium	HU	Hungary	NO	Norway
BF	Burkina Faso	IE	Ireland	NZ	New Zealand
BG	Bulgaria	IT	Italy	PL	Poland
BJ	Benin	JP	Japan	PT	Portugal
BR	Brazil	KE	Kenya	RO	Romania
BY	Belarus	KG	Kyrgyzstan	RU	Russian Federation
CA	Canada	KP	Democratic People's Republic of Korea	SD	Sudan
CF	Central African Republic	KR	Republic of Korea	SE	Sweden
CG	Congo	KZ	Kazakhstan	SG	Singapore
CH	Switzerland	LI	Liechtenstein	SI	Slovenia
CI	Côte d'Ivoire	LK	Sri Lanka	SK	Slovakia
CM	Cameroon	LR	Liberia	SN	Senegal
CN	China	LT	Lithuania	SZ	Swaziland
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	LV	Latvia	TG	Togo
DE	Germany	MC	Monaco	TJ	Tajikistan
DK	Denmark	MD	Republic of Moldova	TT	Trinidad and Tobago
EE	Estonia	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	UG	Uganda
FI	Finland	MN	Mongolia	US	United States of America
FR	France	MR	Mauritania	UZ	Uzbekistan
GA	Gabon			VN	Viet Nam

POSTAGE AND PHOTO VENDING APPARATUS

BACKGROUND OF THE INVENTIONField of the Invention

This invention relates generally to a photography apparatus for producing printed pictures, and more specifically to an apparatus adapted to generate a digitized photo image to be either combined with a postage meter image and/or related postal indicia for printing on an adhesive-backed postage meter strip, or to be uploaded to a host computer.

Description of the Related Art

Postage stamps bearing the portrait of a famous person or historical site have long been an item of interest, especially to stamp collecting enthusiasts. The release by Federal Post Offices of stamps bearing the portraits of famous celebrities has heightened the general public's interest and demand for "special issue" stamps. In view of the public's infatuation with these novelty stamps, it is believed that many postage purchasers would find it exciting to have their personal photo on a stamp. However, the Federal Postal Regulations of most countries prohibit the application of a personal photograph, or other personal artistic expressions, to a stamp. On the other hand, it may be permissible to apply such a personal photo to a postage meter strip, wherein a printing device applies certain images representing a value of postage to a strip of adhesive-backed paper or other suitable photographic medium.

In light of this, there is a need for a device having the ability to combine a personalized photograph with a value of postage (pre-determined or otherwise) on an adhesive-backed postage meter strip for subsequent application to an envelope, postcard, or other item of mail.

In the field relating to photograph vending apparatus, it is known to provide a self-service photo booth or

apparatus for taking one's portrait without the services of a photographer. Apparatus of this type are generally operable by depositing money through a currency receiving mechanism, prompting a camera to take one or more photographs of an individual. The photographs are thereafter developed by wet chemicals within the apparatus and then dispensed to the purchaser after several minutes. In some instances, backgrounds are provided to create a personalized photo, which can be used as a postcard. This has been accomplished by use of various methods, including the use of fixed or interchangeable backdrops behind the persons being photographed.

More recently, self-service photo machines have been equipped with computers, enabling a user to quickly select a backdrop scene from a collection of computer-stored backgrounds. An example of this type of apparatus is disclosed in U.S. Patent No. 5,343,386 to Barber. In this particular apparatus, a self portrait of the user is integrated with the selected background scene, wherein the combined photo is thereafter color printed on a postcard having pre-printed areas on an opposite side for application of postage, address, and a message.

Self-service photo machines may also be useful for obtaining paper passport photos. However, in an attempt to curb fraudulent misuses of its passports, such as switching passport photographs with that of someone other than the true passport holder, Federal Passport Agencies are currently developing systems whereby passport photographs will be scanned by a digital camera or flatbed scanner means and combined with the holder's name, address, date of birth, and all other pertinent information as required on passports. The resultant digitized photograph, combined with the pertinent information of the holder, will be printed on an adhesive-backed clear plastic film, similar in appearance to an overhead projection cell. This film can then be adhered to the inside of a passport and forwarded to the proper passport applicant. A similar process may be

used to issue new driver's licenses and other permits and licenses requiring a photograph for identification.

In light of the fact that Federal Passport Agencies may no longer utilize paper photographs for adherence to its issued passports, but instead utilize digital photo image files, there is a need for a device that produces digital photo image files in such places as post offices, courthouses, etc. In this manner, the digital photo image files can be uploaded to the Passport Agency's central computer by high-speed modem in lieu of scanning a paper photograph in order to create the digitized photograph.

In spite of the various applications and uses for which self-service photo machines have been adapted, none have combined the purchase of a personalized photograph with the purchase of postage. More specifically, there has not been developed an apparatus that integrates a personalized photograph with an adhesive-backed postage meter strip representing a value of postage (pre-determined or otherwise), for subsequent application to an item of mailing. Furthermore, the photograph machines in the related art fail to provide a means to store a digitized photo image for subsequent uploading to a Federal Passport Agency computer for use in processing a passport application.

Accordingly, the present invention provides for the novel combination of a personal photograph integrated with a value of postage and printed on an adhesive-backed postage meter strip, as well as the uploading of a digitized photo image to a host computer.

Summary of the Invention

The present invention is directed to an apparatus for producing a photograph integrated with a postage meter image displaying a particular value of postage on an adhesive-backed postage meter strip. In accordance with the apparatus of the present invention, there is provided touch-sensitive controls, a visual display means, a currency

receiving and/or dispensing device, a hand-held remote control device, a central processor, a hard drive, a high-speed modem, a video camera lens with a controller board positioned and disposed to view and receive a video impression of the user, a thermal receipt printer, and a thermal dot transfer printer or other suitable printer means.

The apparatus is primarily intended for installation in commercial areas such as post offices, courthouses, supermarkets, transportation facilities, etc. as a convenient means for consumers to purchase personalized postage meter strips.

It is a further object of the invention to provide a means for creating passport photo image files. Thus, the present invention eliminates the need to search for a passport photographer, make an appointment, and then travel to the location for the passport photo session.

The photo image files are uploaded by the device to Federal Passport Processing Centers or to a site on the Internet by high-speed modem communications and can be imported directly into the Agency's passport processing software without the necessity of subsequent scanning by the Agency. No device has been developed that provides a self-service means whereby, for a nominal charge, consumers can capture a digital photo image of themselves that is suitable for use by a Federal Passport Agency in issuing to them a valid passport.

In operation, the user simply approaches the apparatus, where he or she is prompted with easy-to-follow instructions appearing on a visual display means. After selecting "Passport Photo" or "PhotoStamp" by touching touch-sensitive controls, the user deposits the indicated amount of money through the currency receiving and/or dispensing device.

If the user selects "Passport Photo," he or she is then instructed on how to use the remote control device for adjusting the camera lens and capturing the photo image when ready. The user is further instructed to stand directly on top of a pair of shoe silhouettes that are affixed to the

floor approximately 6 feet from the camera lens and capture (or freeze) the image that appears in the visual display at will. Depending on the surroundings of a particular location, a white-colored backdrop may be provided, positioned directly behind the shoe silhouettes.

Within approximately 10-30 seconds after the passport photo image has been captured by the user, duplicate receipts are dispensed by the thermal receipt printer; one copy is retained by the user, the other is given to a passport agent by the user, who in turn attaches the receipt to the passport application in lieu of the customary two-inch by two-inch paper passport photo. The thermal paper receipt bears the applicant's photo, at 100 to 300 dpi of resolution. The receipt also displays a Passport Agency File Number in Bar Code form, a date/time stamp, location number, and any other pertinent information as may be required by a Federal Passport Agency.

At pre-determined intervals, the device logs onto a host computer via high-speed modem and uploads the passport photo image files created since the last upload to a Federal Passport Processing Center or Centers, or to a designated site on the Internet. Once uploaded, the files are stored until retrieved by a Federal Passport Processing Center.

A particular photo image file is retrieved by its file name, i.e., the Federal Passport Agency file number appearing on the applicant's receipt, which may be read into the host computer by a bar code reader device. After the passport photo image file has been created and receipts issued to the user, the display means may solicit the user to purchase a "PhotoStamp."

If the user purchases a passport photo image and then decides to purchase a "PhotoStamp," the "PhotoStamp" may be created with the same photo image that was created for the passport. Alternatively, the user can elect to capture a new photo image for use on the "PhotoStamp" if he or she so desires. The user simply deposits an additional sum of money through the currency receiving and/or dispensing

device and follows the instructions appearing on the visual display. If no new photo image is to be taken, the thermal dot transfer printer or other suitable printer means will dispense the "PhotoStamp," or a plurality thereof, within 30 to 60 seconds.

If the user elects to capture a new photo image for the "PhotoStamp," the user is instructed to stand directly on top of a pair of shoe silhouettes that are affixed to the floor approximately 6 feet from the camera lens. The camera is activated and the user can capture (or freeze) the image that appears in the visual display at will, using the remote control device.

With the foregoing in mind, it is a primary object of the present invention to provide an apparatus for producing a personalized photograph integrated with a postage meter image displaying a value of postage on an adhesive-backed postage meter strip for subsequent application to an envelope, postcard, or other item of mail.

It is a further object of the present invention to provide an apparatus, as set forth above, adapted to produce passport photo image files for uploading to a Federal Passport Processing Center or Centers, or its site on the Internet, via high-speed modem communications.

It is still a further object of the present invention to provide a convenient means for purchasing a "PhotoStamp," comprised of an adhesive-backed postage meter strip bearing a personalized photograph of the consumer, with the added option of purchasing and capturing a passport photo image file to be later utilized by a Federal Passport Processing Center in lieu of a standard paper photograph.

It is still a further object of the present invention to provide a self-service photograph apparatus which can be conveniently installed in commercial areas, such as post offices, courthouses, etc., eliminating the need to engage the services of passport photographers.

It is yet a further object of the present invention to provide an apparatus, as set forth above, which is adapted

for use by governmental agencies that issue permits and licenses whereby a photograph of the applicant is needed, including, but not limited to, driver's licenses.

These and other objects and advantages will be more readily apparent in the description which follows.

Brief Description of the Drawings

For a fuller understanding of the nature of the present invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

Figure 1 is a block diagram of the functional component elements of the apparatus of the present invention;

Figure 2 is a front view of the apparatus, showing the front face thereof;

Figure 3 is a side view illustrating a preferred installation setup of the apparatus;

Figure 4A is a side elevation of a backdrop used in connection with the apparatus;

Figure 4B is a top plan view of the backdrop of Figure 4A;

Figure 5 is a top plan view of an example "PhotoStamp" produced by the apparatus shown attached to an envelope;

Figure 6 is a top plan view of an alternative form of an example "PhotoStamp" produced by the apparatus; and

Figure 7 is a top plan view of an example passport photo image receipt produced by the thermal receipt printer.

Like reference numerals refer to like parts throughout the several views of the drawings.

Detailed Description of the Preferred Embodiment

Referring initially to Figure 1, there is illustrated, in block diagram form, the component elements of the photo and postage apparatus 10, with the controlling interaction between the various components being indicated by the interconnecting arrows. In accordance with a preferred

embodiment of the present invention, the apparatus 10 includes a central processor 12 which is programmed with a series of instructions that define operating sequences in response to signals received from touch-sensitive controls 14, a visual display means 9, a hard drive 25, high-speed modem 16, a currency receiving and/or dispensing device 15, a hand-held remote control device 17, a video camera lens with a controller board 19, a video capture board 23, a thermal receipt printer 21, and a thermal dot transfer printer or other suitable printer means 24. Most of the various components of the apparatus 10 are powered by a central power supply 50.

The program in the central processor further provides operating instructions which are transmitted to the visual display 9, prompting a user to deposit a predetermined amount of money to operate the apparatus and to further enter various operating commands on the touch-sensitive controls 14. Initiation of the primary operating sequences is triggered by depositing at least a specified amount of money through the currency receiving and/or dispensing device 15. A hard drive 25 is provided for storing the passport photo image files for uploading via the high-speed modem 16. A memory source is provided on the central processor 12 for storing the postage meter image and/or other postal indicia 40 of the type similarly printed on current postage meter strips and representing a value of postage paid.

A video viewing means includes a video camera lens and controller board 19 structured and disposed for viewing and receiving a video impression and for converting the received impression into a series of electrical impulses. The video camera lens and controller board 19 is generally of the type found in a common hand-held video camcorder or video camera, and is interconnected to and activated by the central processor 12. A motor 22, controlled by the central processor 12, adjusts the angle of the video camera lens relative to the subject being photographed so that the

subject's head is correctly centered vertically within a defined image area on the visual display 9. The central processor 12 operates motor 22 in response to command signals received by the hand-held remote device 17. The electrical impulses representing the viewed and received video impression are delivered from the controller board 19 to a video capture board 23, where the electrical impulses are digitized and stored for subsequent transfer to the central processor 12. The timing of the transfer of the digitized signals (representing at least a single frame of video) is determined by the program in the central processor 12 in accordance with the defined operating sequence.

The captured digitized signals, representing the received video impression, are thereafter integrated with the stored postage meter image and/or other postal indicia in the memory source on the central processor 12. Thereafter, the integrated image (video impression and postage meter image) is transferred from the central processor 12 to a thermal dot transfer printer or other suitable printer means 24, which is activated in sequence in response to a series of instructions by the program in the central processor 12. The combined images are delivered to the thermal dot transfer printer or other suitable printer means 24 in the form of electronic impulse signals. The impulse signals are converted into a photograph, representing the viewed video impression and the postage meter image, and printed on an adhesive-backed postage meter strip 40. One or more postage meter strips 40 are dispensed from a paper supply 35 for individual delivery to the thermal dot transfer printer or other suitable printer 24 upon demand. After printing, the postage meter strip (or a plurality thereof) 40 is dispensed and delivered to the user bearing the user's photograph (see Figures 5 and 6).

The program in the central processor further provides for the production of properly sized passport photo image files, wherein the postage meter indicia images are not integrated with the photo image file. In this particular

instance, the captured electrical impulses, representing the viewed video impression, are transferred from the central processor 12 to the hard drive 25 without integration with the postage meter images, so that only a passport photo image file is produced and stored on the hard drive 25. The stored passport photo image file is subsequently uploaded to a host computer, such as a site on the Internet or a government agency, via the high-speed modem 16.

Referring to Figures 2 and 3, the apparatus 10 is shown mounted within an upright enclosure in accordance with what may be a preferred commercial installation. In operation, the user would approach the exposed face of the apparatus 10 where he or she is prompted with easy-to-follow instructions appearing on a visual display means 9. After depositing the required amount of money through the currency acceptor and/or dispensing device 15 and making appropriate entries by touching touch-sensitive controls 14, the user is instructed to place his/her feet directly on top of a pair of shoe silhouettes 66, which are affixed to the floor approximately 6 feet from the camera lens 19 (See Figure 3). A white colored backdrop 70, or other background scene, may be positioned directly behind the shoe silhouettes 66, depending on the surroundings of a particular location.

Each apparatus can be individually programmed to provide specific identifying postal indicia on the "PhotoStamp." By connecting to the apparatus with a modem 16, a special security code number specific to a particular apparatus 10 is entered to enable programming of specific data. In particular, the user, such as the post office, can enter the city, state, zip code, current date, and any other pertinent data into the central processor 12. This information is stored on the hard disk. The entered data is used to produce a completed "PhotoStamp." The date (and time, if applicable) which is printed on the "PhotoStamp" is maintained by the central processor's built-in clock. The apparatus 10 further has the capability of generating reports. In particular, a report of the day's activity

(e.g., number of "PhotoStamps" and/or passport photo image files created), plus a running total of the money received, is output on demand via the thermal receipt printer 21, or uploaded via modem 16.

While the invention has been shown and described in what is considered to be a practical and preferred embodiment, it is recognized that departures may be made within the spirit and scope of the following claims which, therefore, should not be limited except within the Doctrine of Equivalents.

Now that the invention has been described,

Claims

1. An apparatus for producing photographs comprising:
input means for entering operational selections to generate control signals,

a central processor programmed with a series of instructions that define operating sequences responsive to received signals including said control signals,

video viewing means including a video camera lens and a controller board structured and disposed for viewing and receiving a video impression and being further structured to convert said received video impression into a series of electrical impulses,

video capture means connected to said central processor and said video viewing means for selectively receiving and digitizing a select group of said series of electrical impulses to create a digitized photo image for subsequent transfer to said central processor, and

printer means connected to said central processor and activated in sequence in response to said series of instructions, and being structured and disposed to receive electronic impulse signals from said central processor and to print on a substrate.

2. An apparatus as recited in claim 1 wherein said input means includes a visual display means including a surface having sensitivity means responsive to touch to generate said control signals.

3. An apparatus as recited in claim 2 wherein said input means further includes a hand-held remote control means.

4. An apparatus as recited in claim 3 wherein said visual display means is structured and disposed to receive said series of electrical impulses and to further display said viewed video impression.

5. An apparatus as recited in claim 4 wherein said viewed video impression is displayed on said visual display means within a defined photo image area on said visual display means.

6. An apparatus as recited in claim 5 further including means for adjusting and controlling the location of said photo image area on said visual display means.

7. An apparatus as recited in claim 6 wherein said means for adjusting and controlling location of said photo image area on said visual display means is responsive to signals from said hand-held remote control.

8. An apparatus as recited in claim 7 further including means for selectively adjusting the position of said video camera lens through a range of adjusted positions.

9. An apparatus as recited in claim 8 wherein said means for selectively adjusting the position of said video camera lens is operable in response to said signals from said hand-held remote control.

10. An apparatus as recited in claim 1 further including means for storing said digitized photo image.

11. An apparatus as recited in claim 10 further including means for uploading said digitized photo image to a host computer.

12. An apparatus for producing photographic image files comprising:

input means for entering operational selections to generate control signals,

a central processor programmed with a series of instructions that define operating sequences responsive to received signals including said control signals,

camera means for viewing an image and converting the viewed image into a series of electrical impulses,

means for capturing at least a portion of said series of electrical impulses,

means for digitizing said captured series of electrical impulses to create a digitized photo image,

means for storing said digitized photo image, and

means for uploading said stored digitized photo image to a host computer.

13. An apparatus as recited in claim 12 wherein said

means for uploading includes modem means.

14. An apparatus for producing photographic image files comprising:

input means for entering operational selections to generate control signals,

a central processor programmed with a series of instructions that define operating sequences responsive to received signals including said control signals, and including a data storage means for storing at least one postage meter image representing a value of postage,

video viewing means including a video camera lens and a controller board structured and disposed for viewing and receiving a video impression and being further structured to convert said received video impression into a series of electrical impulses,

means for capturing at least a portion of said series of electrical impulses,

means for digitizing said captured series of electrical impulses to create a digitized photo image,

means for storing said digitized photo image,

means for selectively uploading said stored digitized photo image to a host computer,

means for selectively combining said stored digitized photo image with said stored postage meter image, and

printer means connected to said central processor and activated in sequence in response to said series of instructions, and being structured and disposed to receive electronic impulse signals, including electronic impulse signals comprised of the combination of said digitized photo image and said postage meter image, and to print indicia including a visual production of the digitized photo image combined with the postage meter image on a substrate.

15. An apparatus as recited in claim 14 wherein said printer means includes a first printer for printing receipts and a second printer for receiving the combined digitized photo image and postage meter image and then printing the visual production on the substrate.

16. An apparatus as recited in claim 15 wherein said first printer is a thermal printer.

17. An apparatus as recited in claim 15 wherein said second printer is a thermal dot transfer.

18. An apparatus for producing photographs comprising:
storage means for storing postage meter indicia representing a value of postage,

camera means for viewing and capturing a viewed photographic impression,

photographic processing means for converting the viewed photographic impression into a photograph, and

means for applying the photograph and stored postage meter indicia on a substrate.

19. An apparatus as recited in claim 18 wherein said camera means includes a video camera lens and a controller board structured and disposed for viewing and receiving a video impression and for converting said received impression into a series of electrical impulses.

20. An apparatus as recited in claim 19 wherein said means for applying the photograph includes a thermal dot transfer printer.

21. An apparatus as recited in claim 18 wherein said substrate is a paper strip having an adhesive substance on one side thereof and a suitable printing surface on the opposite side.

22. A method for producing a postage meter strip comprising:

storing at least one postage meter image representing a value of postage in a data storage means,

viewing and receiving a photographic impression,

capturing said photographic impression,

combining said photographic impression with said postage meter image, and

printing said combined photographic impression and said postage meter image on a substrate.

23. A method for producing photographic image files comprising the steps of:

viewing an image with camera means and converting the viewed image into a series of electrical impulses,

capturing at least a portion of said series of electrical impulses,

digitizing said captured series of electrical impulses to create a digitized photo image,

storing said digitized photo image,

uploading said stored digitized photo image to a host computer,

storing said digitized photo image on said host computer, and

subsequently retrieving said digitized photo image for processing a document requiring a photograph.

1/4

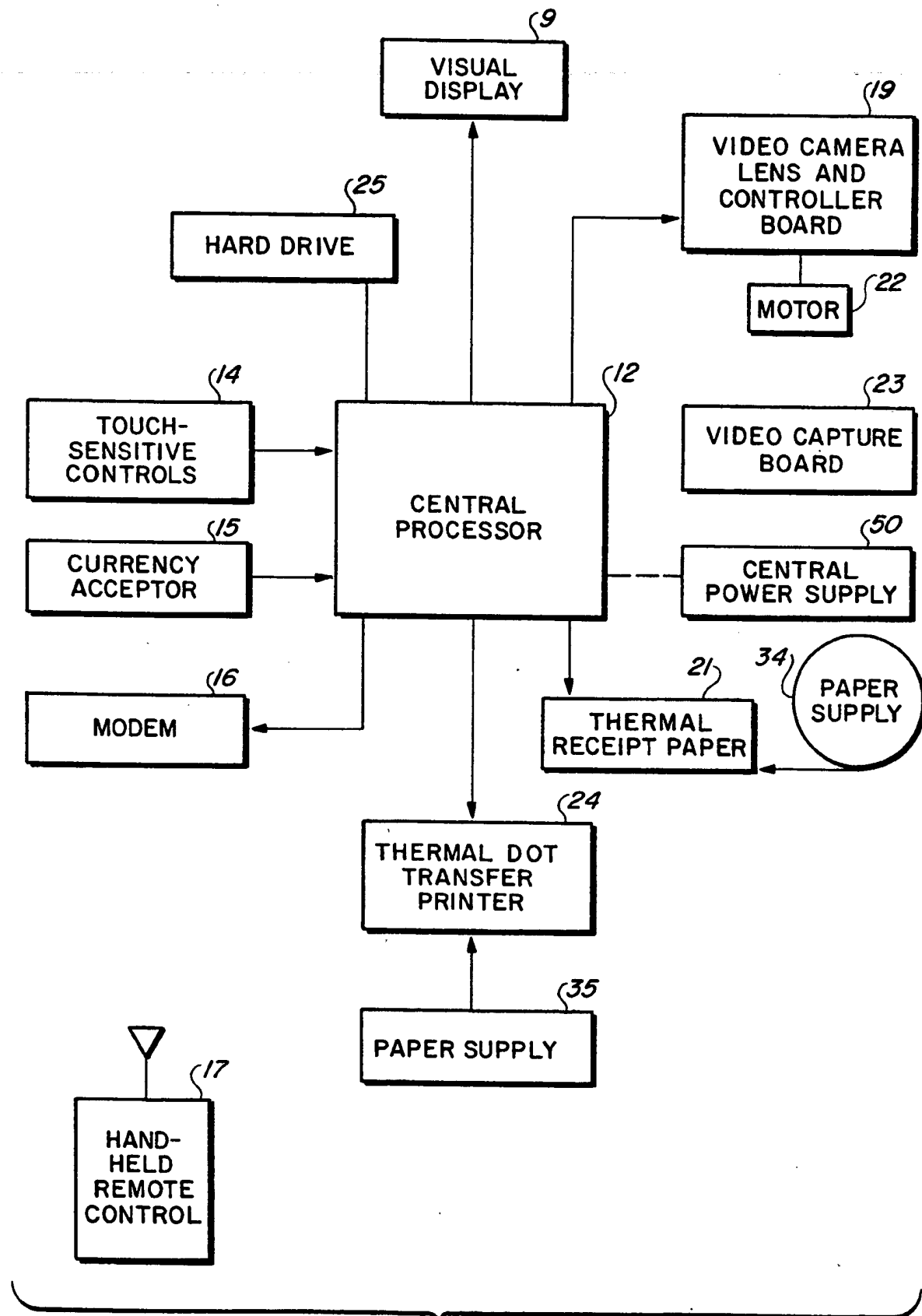
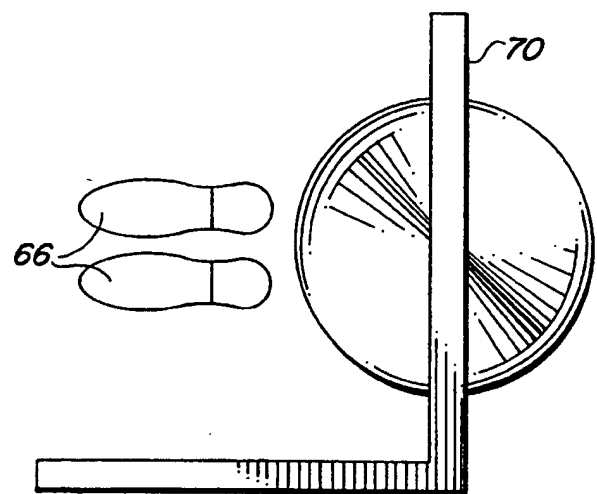
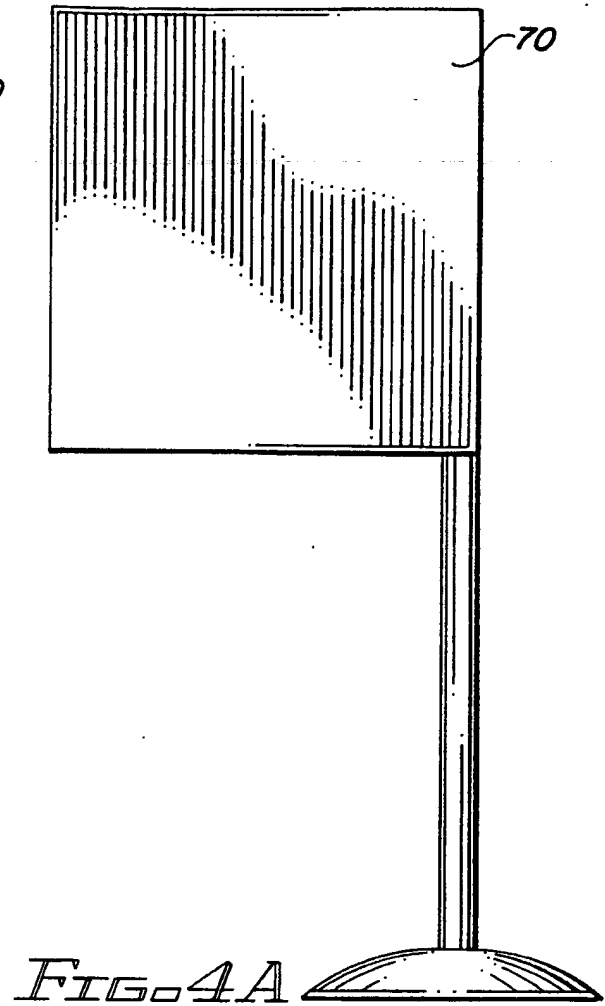
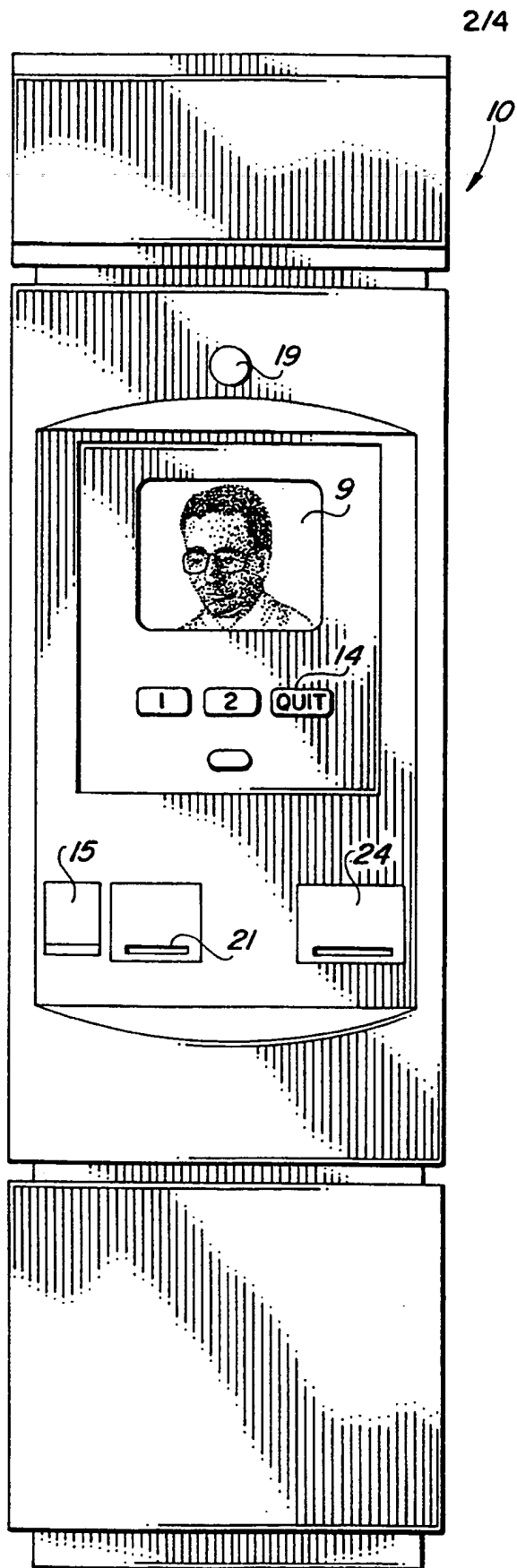


FIG. 1
SUBSTITUTE SHEET (RULE 26)



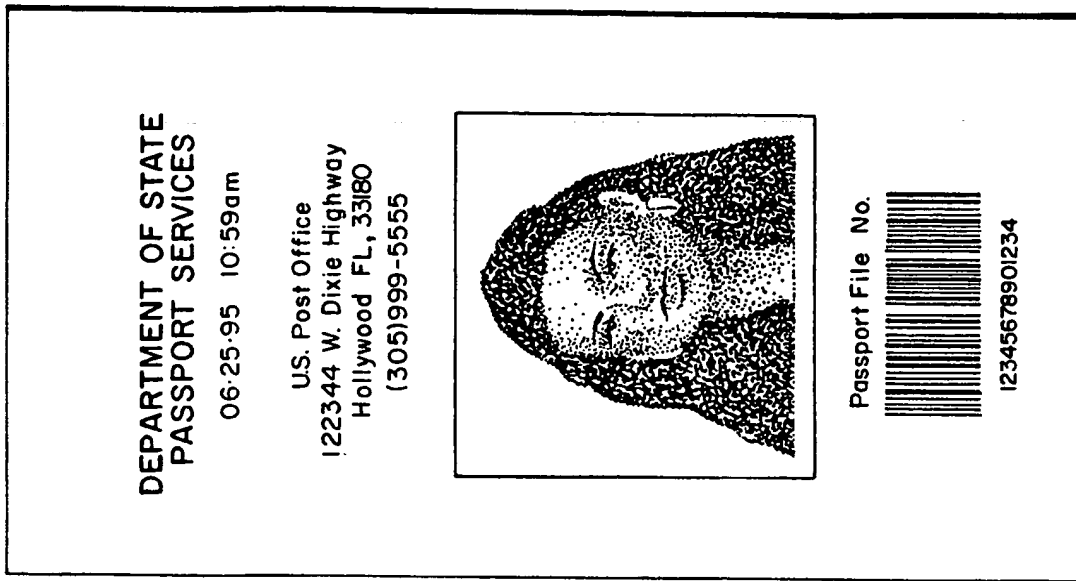


FIG. 7

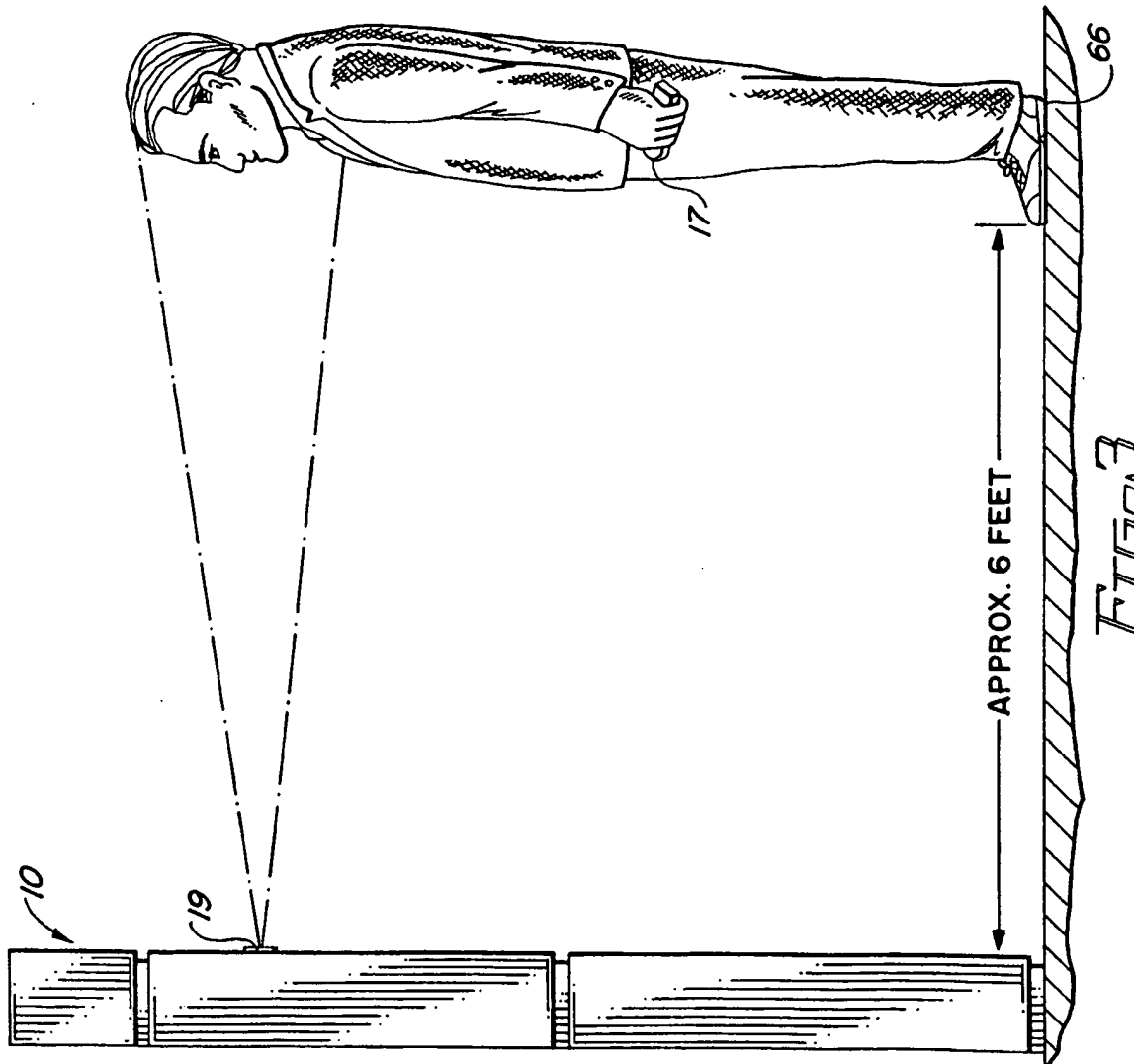
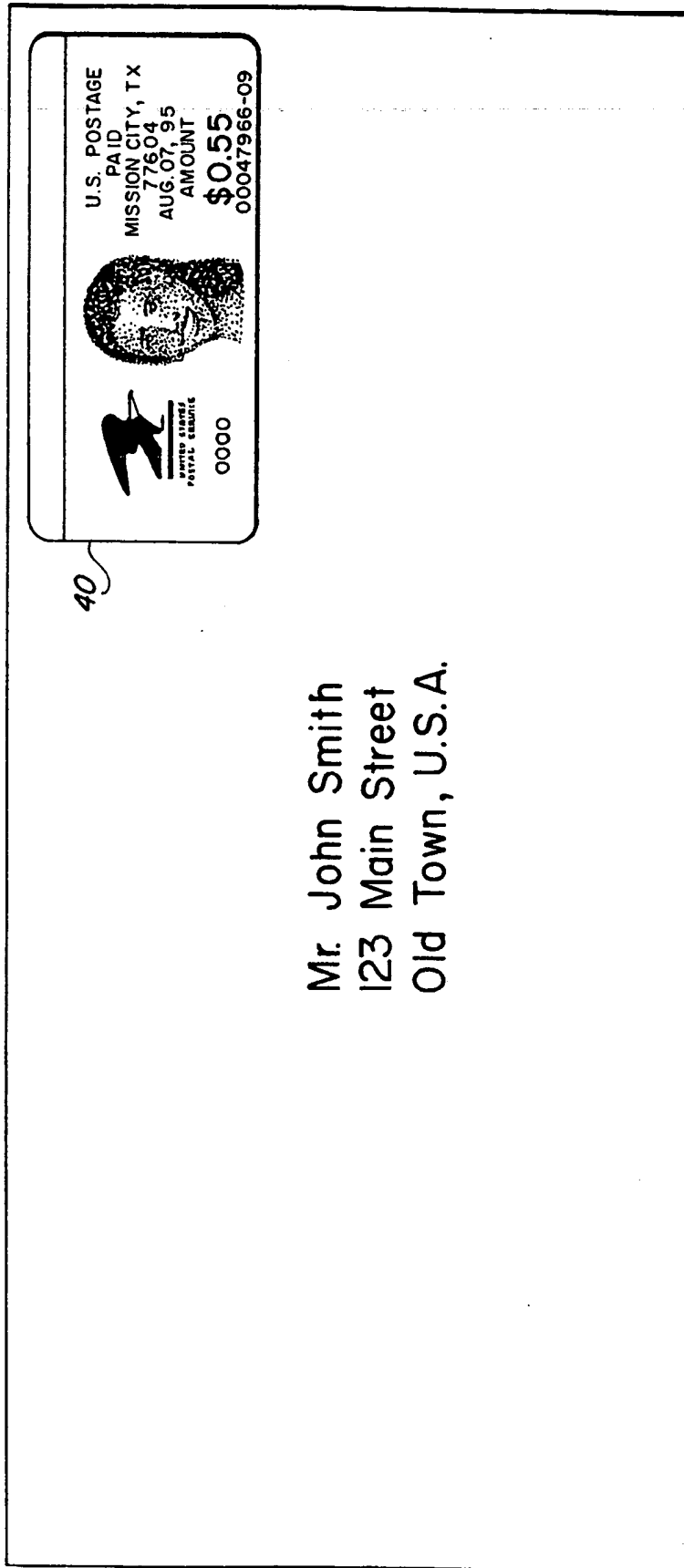


FIG. 3



Mr. John Smith
123 Main Street
Old Town, U.S.A.

FIG 5

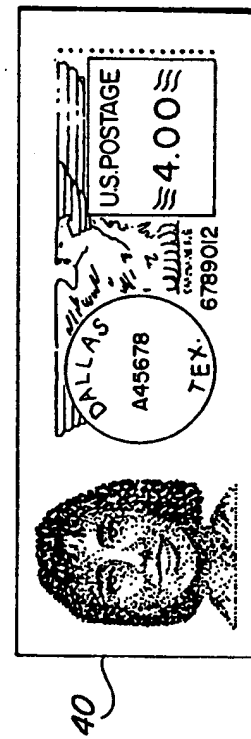


FIG 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US95/11877

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G03B 29/00

US CL : 354/76

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 354/75,76,109,111,266

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 4,024,380 (Gunn) 17 May 1977, see entire document	14, 15, 18, 21, 22
A	US, A, 5,184,160 (Massarsky) 02 February 1993	8-9
Y	US, A, 5,204,753 (Tai) 20 April 1993, col. 2, lines 55-60	16-17
Y	US, A, 5,202,765 (Lineberry) 13 April 1993, col. 1, lines 10-25	5-7
Y	US, A, 5,343,386 (Barber) 30 August 1994, see entire document	1-23
Y	US, A, 5,389,986 (Tsuji et al.) 14 February 1995, see entire document	3, 7, 9

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

30 NOVEMBER 1995

Date of mailing of the international search report

04 MAR 1996

 Name and mailing address of the ISA/US
 Commissioner of Patents and Trademarks
 Box PCT
 Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

Chapik

Telephone No. (703) 308-7620

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/11877

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,459,926 (Stroschin et al.) 26 September, 1995, col.1 lines 54-60	2